Program Announcement to DOE National Laboratories

Natural Gas Hydrate Program Applied Research

1.0 SUMMARY:

Beginning in FY 2000 the US Department of Energy (DOE), National Energy Technology Laboratory (NETL) will seek applications for research and development activities in support of its Natural Gas Hydrate Program. Proposals are requested to increase and enhance the NETL Natural Gas Hydrate (NGH) research and development activities as described in the NETL National Methane Hydrate Multi-Year Program Plan. Research proposals that involve consortia of universities, industry, and other government agencies led by National Laboratories are preferred for site characterization studies. It is anticipated that the proposals will cover the four research areas defined in the DOE hydrate plan to include: characterization of natural gas hydrates, potential production evaluation, global carbon cycle, and safety related to seafloor stability. Specific applied laboratory research on science-based NGH characterization of the physical attributes of NGH deposits are also sought.

$470,000 of FY-2000 funding is expected to be available to fund the first year of selected research efforts. Subsequent funding for selected projects will depend upon the availability of future year appropriations--as well as upon satisfactory progress toward project goals and deliverables. Collaborations between industry, university, and DOE National Laboratory participants are required for field characterization research activities and encouraged for laboratory characterization efforts under this Program Announcement. Greater priority will be given to those proposals that have cost sharing.

2.0 SUPPLEMENTARY INFORMATION

Introduction & Background

In 1997 The President's Committee of Advisors on Science & Technology (PCAST) published a report on "Federal Energy Research and Development for the Challenges of the Twenty-First Century." The importance of gas hydrate research has been underscored by the PCAST report which recommended that DOE's Fossil Energy (FE) organization develop a science based program with industry and other government agencies to "understand the potential of methane hydrates worldwide."

In the DOE FE National Methane Hydrate Multi-Year Research and Development Program Plan four areas have been identified through workshops with academia, industry, and other government agencies. Areas for research include Resource Characterization, Production, Global Carbon Cycle, and Safety and Seafloor Stability. This report is the basis for initiating

this request for proposals from the National Laboratories.

The main challenges for the NETL NGH Program are to improve exploration and production tools to locate and evaluate the resource through a suite of laboratory and field methodologies while developing technologies for detecting, quantifying, and producing the potential energy source. Associated technical objectives of this program are to:

(1) characterize the resource to determine the physical attributes of naturally occurring hydrate deposits and apply to determination of recoverable gas in place which may be affected by future development and application of innovative production and utilization systems;

(2) establish the technical, environmental, and economic feasibility of producing gas from the variety of depositional environments;

(3) determine the environmental consequences of large-scale production and/or decomposition as related to safety and seafloor stability;

(4) develop opportunities to integrate fossil energy technologies to the evaluation of the resource; and

(5) discover innovative technologies to develop and produce gas for future energy demand in the US.

Goals and Objectives

Recognizing the breath of expertise and capabilities of the DOE National Laboratories, a primary purpose of this Program Announcement is to seek projects that increase and enhance NETL's gas hydrate research and development activities. In addition to Memorandums of Understanding (MOU) and other agreements, future Program Announcements will establish a systematic approach to facilitate programmatic planning for incorporating the research activities of the DOE National Laboratories, and significantly increases the likelihood of success in developing cost-effective hydrate characterization technologies. It is intended that as the Natural Gas Hydrate Program grows, the National Laboratory component of the program will also increase and will be focused on topics and priorities to be defined in future Program Announcements.

National Laboratory research activities in NGH characterization to be funded in FY-2000 will be selected based upon this Program Announcement. Hence, ongoing FY-2000 Laboratory projects which intend to seek continued funding in FY- 2001 MUST respond to this Program Announcement. Project participants must submit a FWP by May 31, 2000. The timing and extent of future program announcements will be determined by the

progress of on-going research activities and funding availability.

NETL has announced a Program Solicitation, "Research and Development of Technologies for the Characterization of Natural Gas Hydrates", that seeks proposals from private industry, academia, small and large businesses, and research institutes in the research areas described herein. It is expected that the research activities selected from the Program Solicitation and this Program Announcement will significantly accelerate the development of a broad portfolio of evaluation options and present the best opportunities for meeting the Gas Hydrate Plan goals.

Technical Areas of Interest

Proposers may submit research proposals for any topic area, for more than one topic area, and for research activities that encompass more than one topic area. An example of a proposal encompassing more than one topic area could involve both physical characterization and modeling of NGH occurrences in onshore and offshore environments. Separate proposals for each respective topic area must be submitted if a proposer desires to submit multiple proposals.

Applied research on NGH characterization

General

Research pathways and approaches, which have multiple applications and use under a broad range of scenarios, are desired. The integration of concepts and projects, including criteria and priorities for project selection, must be clearly established to allow development of costs associated with the capture and separation technology.

Geologic and reservoir characterization & technology Focus Area

Geologic characterization efforts will include a broad set of geologic formations, with initial emphasis on known NGH occurrences. Proposals in this topic area must demonstrate how applied science knowledge and technologies can be used in characterization of NGH occurrences in the onshore and offshore. Proposals should address how both advanced techniques applicable to traditional oil and gas exploration and extraction, and how science and technologies from outside these fields will be brought to bear on evaluating the NGH resource.

Proposals should address research to determine the long-term environmental and impact on use a future energy resource, and to measure and verify the amounts of gas hydrates in the US. They should also address research to define the impact on the environmental, cost and performance factors, and the compositions or "quality of

gas/brines/sediments in the resource.

Applied research on science-based NGH evaluation in selected research areas

General

While the emphasis of this category is on the research priorities contained in the, other innovative novel ideas and concepts that have significant impact of developing NGH resource potential are also desired. Each proposal should address how it draws upon the unique capabilities of the Laboratory and the project team, past and ongoing fundamental science, and how research results will be transferred to practice. Teaming with industry is encouraged. Leveraging of funding cost sharing and collaboration with industry and university partners is encouraged. Each proposal should address how the results of the research would contribute to the goals of the NGH Program. In addressing this, a systems context must be adopted to determine the benefits, identify uncertainties, and evaluate the utility of the technology for NGH evaluation. This systems evaluation must address both the potential benefits to the particular application(s) in which results would be used, the degree to which it has the potential for widespread use versus niche uses, and the extent the technology meets the NGH Program Goals.

Selected Research Areas

A. Opportunities for Integration

- Applied research geared towards providing characterization data for access by other researchers in the quantification of NGH in both the onshore and offshore environments.

- Integrated projects with other research efforts to collect data in the onshore and offshore to leverage funding in high cost areas of the US.

B. Onshore

The objectives of this topic area include identifying the geological, geophysical, geo-chemical, and detecting and quantifying onshore NGH resources. Knowledge of the accomplishments to biological characteristics of NGH occurrences and the effectiveness of current tools in date in the onshore environments is a must.

C. Offshore

The objectives of this topic area are associated with the problems of seafloor stability and the characterization of the depositional systems and hydrodynamics of the NGH stability zones in the offshore. Research that involves collaboration and cooperation with other ocean research programs to produce results critical to program goals is strongly encouraged. NETL is interested in receiving research proposals that reduce costs by integration with other offshore characterization efforts.

D. Science & Technology

This selected research topic is included in laboratory physical characterization research. Research proposals are sought for unique or innovative application of science or technologies to reduce the costs of detection and quantification of NGH resources.

3.0 PERIOD OF PERFORMANCE

NETL suggests, but does not require, that proposals offer a separate task and a corresponding cost structure that permits partial awards if appropriate. Consortia projects with industry, other government agencies and universities are preferred in field characterization research efforts, and individual laboratory efforts for science and technology related experiments relative to evaluation of the physical characterization of hydrates, fluids and sediments relative to depositional environments.

Periods of performance should coincide with fiscal year budget periods. Project continuation shall be subject to (1) funds availability; (2) sufficient progress in the research effort; (3) sufficient progress towards completing the objectives in accordance with a mutually agreed upon management plan; and (4) submission of timely and informative reports.

4.0 REPORTING

Successful applicants selected for field activities will be required to submit a Management Plan that includes a description of how a proposed consortium would be organized, managed, and operated. The Management Plan must also include; a description of how needed expertise from outside the proposed consortia, such as university-based researchers, would be integrated into the research performed by the consortia. Also required would be how the results of scientific research activities funded by other participants will be transferred to the applied research activities included in the Gas Hydrate Program at NETL.

Successful applicants selected will be required to submit digital quarterly Technical Reports, comprehensive Final Reports, and digital data to support the research results.

5.0 FIELD WORK PROPOSAL EVALUATION AND SELECTION

Qualification Criteria: Fieldwork proposals must meet the following two criteria to be considered for award.

Criterion 1

Proposals for field characterization efforts must include industrial participation in the proposed research activities or proposals must include two or more National Laboratories as members of a consortium.

Or:

Criterion 2:

Proposals must address characterization of NGH relative to the impact of the research in one of the areas of resource evaluation, production, global carbon cycle or safety and seafloor stability.

Evaluation Criteria: The following four (4) criteria will be used in the technical evaluation of the field work proposals.

Criterion 1:

Research Concept and Plan (40%)

Applications will be evaluated using the following considerations:

1) Responsiveness of the proposal to research priorities identified in the "National Methane Hydrate Multi-Year R&D Program Plan"—especially how proposed outcomes will benefit the NGH Program goals.
2) 2) Adequacy of the statement of objectives--including a review of work completed to date.
3) 3) Technical feasibility of the proposed research.
4) 4) Appropriateness of the schedule (principal milestones, decision points, and time for each task).

Criterion 2:

Applicant/Team Capabilities and Facilities (20%)

Capabilities and facilities shall be evaluated considering:

A. Ability to assemble and manage a multi-disciplined team with research experience and qualifications of project personnel in the proposal subject area.

B. Display an understanding of historical accomplishments and advanced developments in the area of the proposed research.

C. List the availability of equipment, laboratory and demonstration facilities, analytic support and other necessary resources for performing the work relative to the project goals.

D. Present a detail of the planned level of manpower to complete the research tasks and responsibilities of the participants.

Criterion 3:

Industrial Involvement (20%)

Industrial involvement shall be evaluated considering: a) the level of participation, the number of industry partners, and the level of participant data or cost-sharing; and b) identification of, and commitment to, a viable plan to transfer the technology to industry at the earliest practicable time.

Criterion 4:

Other Participant (Federal, State, or Local Government Agencies, Universities and/or Academic) Involvement (20%)

Federal, state, or local government involvement shall be evaluated considering collaborative activities that further sequestration technology development. University/Academic involvement shall be evaluated considering the level of participation by a university or other academic institution to: a) support research and development tasks; b) educate technical professionals; and/or c) facilitate communication to help transfer technology; or f) educate the public regarding the benefits of sequestration technology.

6.0 PROGRAMMATIC CONSIDERATIONS

In conjunction with the evaluation results and rankings of individual applications, NETL shall make selections for negotiations and planned awards from among the highest ranking applications, using the following programmatic considerations:

A. Desire to select fieldwork proposals addressing the research priorities identified in Section 2.0.

B. Desire to select fieldwork proposals that offer integrated multi-participant research activities.

C. Desire to select fieldwork proposals that offer particularly innovative, yet technically feasible NGH characterization studies.

D. Desire to select field work proposals that include; University/Academic involvement as an integral part of the proposed project by their directly performing research and development activities; educating technical professionals; and facilitating technology transfer and discussion through the NETL sponsored hydrate web page and www.netl.doe.gov.

7.0 SUBMISSION OF APPLICATIONS

One original and six copies of each fieldwork proposal shall be submitted by 3:00 P.M. EST on May 31, 2000.

Fieldwork proposals shall be submitted to:

US Department of Energy
National Energy Technology Center
PO Box 880
Morgantown, WV 26505
Attention: Brad Tomer
Telephone: (304) 285-4296
E-mail: btomer@netl.doe.gov